Claims

1. A composite metal sealing ring for sealing between a first and second tubular members, the first tubular member having a first bore and a first conical inner sealing surface, the second tubular member having a second bore and a second conical inner sealing surface, the metal sealing ring comprising:

a metal body having a body central bore substantially aligned with the first and second bores of the first and second tubular members;

a first conical outer sealing surface on the metal body for sealing with the first conical inner sealing surface;

a second conical outer sealing surface on the metal body axially opposing the first conical outer sealing surface for sealing with the second conical inner sealing surface; and

at least one of a first and second corrosion-resistant inlay defining a respective one of the first and second conical outer sealing surfaces on the metal body.

2. A composite metal sealing ring as defined in Claim 1, wherein at least one of the first and second inlays comprises one of stainless steel and corrosion resistant alloy.

3. A composite metal sealing ring as defined in Claim 1, wherein the metal body comprises:

one of a carbon steel and a low alloy steel.

4. A composite metal sealing ring as defined in Claim 1, wherein a nominal inlay thickness is between about 1/32" and 3/16".

5. A composite metal sealing ring as defined in Claim 1, wherein a nominal inlay thickness is less than about 10% of a nominal metal body thickness.

6. A composite metal sealing ring as defined in Claim 1, wherein a nominal inlay volume is between 2% and 30% of a nominal total volume of the composite metal sealing ring.

7. A composite metal sealing ring as defined in Claim 1, further comprising:

a corrosion-resistant coating on one or both of the metal body and the at least one corrosion resistant inlays.

8. A composite metal sealing ring as defined in Claim 7, wherein the corrosion-resistant coating is selected from the group consisting of silver, tin, molybdenum di-sulfide, and fluoropolymer.

9. A composite metal sealing ring as defined in Claim 1, wherein an expansion coefficient of the metal body is less than 6.5E-6 within a temperature range of between 0 and 350°F.

10. A composite metal sealing ring as defined in Claim 1, wherein at least one of the first and second inner conical sealing surfaces includes a backup sealing surface adjacent a respective primary conical sealing surface; and

the at least one of the first and second conical outer sealing surfaces on the metal body defined by the at least one of the first and second corrosion-resistant inlays seals with the backup sealing surface.

11. A composite metal sealing ring as defined in Claim 1, further comprising:

the metal sealing ring is selected from the group consisting of an AX type, BX type, CX type, DX type, RX type, and VX type gasket.

12. A composite metal sealing ring for sealing between a first and second tubular members, the first tubular member having a central bore and a first conical inner sealing surface, the second tubular member having a central bore and a second conical inner sealing surface, the composite metal sealing ring comprising:

a metal body comprising one of a carbon steel and a low alloy steel, the metal body having a body central bore substantially aligned with the central bores of the first and second tubular members;

a first conical outer sealing surface for sealing with the first conical inner sealing surface;

a second conical outer sealing surface axially opposing the first conical outer sealing surface for sealing with the second conical inner sealing surface; and

at least one of a first and second corrosion-resistant inlay comprising one of stainless steel and corrosion resistant alloy, the corrosion-resistant inlay defining a respective at least one of the first and second conical outer sealing surfaces and having a nominal inlay thickness of between about 1/32" and 3/16".

13. A composite metal sealing ring as defined in Claim 12, further comprising:

a corrosion-resistant coating on one or both of the metal body and the at least one corrosion resistant inlays.

14. A composite metal sealing ring as defined in Claim 13, wherein the corrosion-resistant coating is selected from the group consisting of silver, tin, molybdenum di-sulfide, and fluoropolymer.

15. A composite metal sealing ring as defined in Claim 12, wherein an expansion coefficient of the metal body is less than 6.5E-6 within a temperature range of between 0 and 350°F.

16. A composite metal sealing ring as defined in Claim 12, wherein at least one of the first and second inner conical sealing surfaces is a backup sealing surface adjacent a respective primary conical sealing surface; and

the at least one of the first and second conical outer sealing surfaces defined by the at least one of the first and second corrosion-resistant inlays seals with the backup sealing surface.

17. A method of sealing between a first and second tubular members, the first tubular member having a central bore and a first conical inner sealing surface, the second tubular member having a central bore and a second conical inner sealing surface, the metal sealing ring comprising:

providing a metal body having a body central bore;

substantially aligning the body central bore with the central bores of the first and second tubular members;

providing a first conical outer sealing surface for sealing with the first conical inner sealing surface;

providing a second conical outer sealing surface axially opposing the first conical outer sealing surface for sealing with the second conical inner sealing surface;

providing at least one of a first and second corrosion-resistant inlays to define a respective at least one of the first and second conical outer sealing surfaces; and

axially urging the first and second tubular members toward one another, to sealingly engage the first conical outer sealing surface with the first conical inner sealing surface and sealingly engage the second conical outer sealing surface with the second conical inner sealing surface.

18. A method as defined in Claim 17, wherein at least one of the first and second inlays comprises one of stainless steel and corrosion resistant alloy.

19. A method as defined in Claim 17, wherein the metal body comprises:
one of a carbon steel and a low alloy steel.

20. A method as defined in Claim 17, further comprising:
selecting a nominal inlay thickness between about 1/32" and 3/16".

21. A method as defined in Claim 17, further comprising:

selecting a nominal inlay thickness less than about 10% of a nominal metal body thickness.

22. A method as defined in Claim 17, further comprising:

selecting a nominal inlay volume between 2% and 30% of a nominal total volume of the composite metal sealing ring.

23. A method as defined in Claim 17, further comprising:

coating one or both of the metal body and the at least one corrosion resistant inlays with a corrosion-resistant coating.

24. A method as defined in Claim 17, further comprising:

selecting the corrosion-resistant coating from the group consisting of silver, tin, molybdenum di-sulfide, and fluoropolymer.

25. A method as defined in Claim 17, wherein an expansion coefficient of the metal body is less than 6.5E-6 within a temperature range of between 0 and 350°F.

26. A method as defined in Claim 17, wherein at least one of the first and second inner conical sealing surfaces is a backup sealing surface adjacent a respective primary conical sealing surface; and

the at least one of the first and second conical outer sealing surfaces defined by the at least one of the first and second corrosion-resistant inlays seals with the backup sealing surface.

27. A method as defined in Claim 17, further comprising:

selecting a shape from the group consisting of AX, BX, CX, DX, RX, and VX type gaskets.

28. A composite metal sealing ring for sealing with a first tubular member, the first tubular member having a first bore and a first inner sealing surface, the composite metal sealing ring comprising:

a metal body having a body central bore substantially aligned with the first bore of the first tubular member;

a first outer sealing surface on the metal body for sealing with the first inner sealing surface; and

a first corrosion-resistant inlay defining the first outer sealing surface on the metal body.

29. A composite metal sealing ring as defined in Claim 28, wherein at least one of the first outer sealing surface on the metal body and the first inner sealing surface on the first tubular member is frustoconical.

30. A composite metal sealing ring as defined in Claim 28, further comprising:

a second outer sealing surface on the metal body opposite the first outer sealing surface, the second outer sealing surface for sealing with a second inner sealing surface of a second tubular member, the second tubular member having a second bore substantially aligned with the body central bore.

31. A composite metal sealing ring as defined in Claim 30, further comprising:

a second corrosion-resistant inlay defining the second outer sealing surface on the metal body.

32. A composite metal sealing ring as defined in Claim 30, wherein at least one of the second outer sealing surface on the metal body and the second inner sealing surface on the second tubular member is frustoconical.

33. A composite metal sealing ring as defined in Claim 28, further comprising:

a second outer sealing surface on the metal body opposite the first outer sealing surface, the second outer sealing surface for sealing with a second sealing surface of a second body, for sealing pressure between the first tubular member and the second body.

34. A composite metal sealing ring as defined in Claim 33, wherein the second body comprises:

an end flange.